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Title: Midamble allocation in 1.28 Mcps TDD
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1 Summary

This paper proposes the following changes to the working CR of the 1.28 Mcps TDD for 25.221:

1. Section “Burst Types” renamed into Burst Format
2. Clarification of used burst formats for P-CCPCH, S-CCPCH and RACH
3. Clarification of used default midamble association in TS0 to the “K=8 association”
4. Midamble allocation described, marked to be common with 3.84Mcps TDD
5. Number of Code signalling schemes via midamble adapted

2 Proposal

It’s proposed to discuss and include the following text proposal into the working CR for 25.221.

---------- Changes to working CR of 25.221 begin ----------

6.2.2 Burst ~~Types~~Format

6.3 Common physical channels

6.3.1 Primary common control physical channel (P-CCPCH)

The BCH as described in subclause 'Common Transport Channels' is mapped onto the Primary Common Control Physical Channels (P-CCPCH1 and P-CCPCH2). The position (time slot / code) of the P-CCPCHs is fixed in the 1.28Mcps TDD. The P-CCPCHs are mapped onto the first two code channels of timeslot#0 with spreading factor of 16, see subclause 'Common Transport Channels'. The P-CCPCH is always transmitted with an antenna pattern configuration that provides whole cell coverage.

6.3.1.1 P-CCPCH Spreading

The P-CCPCH uses fixed spreading with a spreading factor SF = 16. The P-CCPCH1 and P-CCPCH2 always use channelisation code $c_{Q?16}^{(k?1)}$ and $c_{Q?16}^{(k?2)}$ respectively.

6.3.1.2 P-CCPCH Burst ~~Types~~Format

The burst format as described in section 6.2.2 is used for the P-CCPCH. No TFCI is applied for the P-CCPCH.

6.3.1.3 P-CCPCH Training sequences

The training sequences, i.e. midambles, as described in the subclause on midamble generation are used for the P-CCPCH. The basic midamble code $m^{(1)}$ is used for P-CCPCHs as training sequence.

6.3.2 Secondary common control physical channel (S-CCPCH)

PCH and FACH are mapped onto one or more secondary common control physical channels (S-CCPCH). In this way the capacity of PCH and FACH can be adapted to the different requirements. The time slot and codes used for the S-CCPCH are broadcast on the BCH.

6.3.2.1 S-CCPCH Spreading

The S-CCPCH uses fixed spreading with a spreading factor SF = 16. The S-CCPCHs (S-CCPCH 1 and S-CCPCH 2) are always used in pairs, mapped onto two code channels with spreading factor 16. There can be more than one pair of S-CCPCHs in use in one cell.

6.3.2.2 S-CCPCH Burst ~~Types~~Format

The burst format as described in section 6.2.2 is used for the S-CCPCH. TFCI may be applied for S-CCPCHs.

6.3.2.3 S-CCPCH Training sequences

The training sequences, i.e. midambles, as described in the subclause on midamble generation, are also used for the S-CCPCH.

6.3.3 The physical random access channel (PRACH)

The RACH is mapped onto one or more uplink physical random access channels (PRACH). In such a way the capacity of RACH can be flexibly scaled depending on the operators need.

6.3.3.1 PRACH Spreading

The uplink PRACH uses either spreading factor SF=16 or SF=8 as described in subclause 6.2.1.1. The set of admissible spreading codes for use on the PRACH and the associated spreading factors are broadcast on the BCH (within the RACH configuration parameters on the BCH).

The uplink PRACH uses either spreading factor SF=16 or SF=8 as described in subclause of ‘The Random Access Channel (RACH)’. The PRACH configuration (time slot number and assigned spreading codes) is broadcast through the BCH.

6.3.3.2 PRACH Burst ~~Types~~Format

The burst format as described in section 6.2.2 is used for the PRACH.

6.3.3.3 PRACH Training sequences

The training sequences, i.e. midambles, of different users active in the same time slot are time shifted versions of a single periodic basic code. The basic midamble codes as described in subclause about midamble generation are used for PRACH.

6.6 Midamble Allocation for Physical Channels

The midamble allocation schemes for physical channels are the same as in the 3.84Mcps TDD option. The associations between channelisation codes and midambles for the default and common midamble allocation differ from the 3.84 Mcps TDD option. The associations are given in Annex C.2 [Association between Midambles and channelisation Codes] and D [Signalling of the number of channelisation codes for the DL common midamble case for 1.28Mcps TDD] respectively

.6.6.1 Midamble Allocation for DL Physical Channels

Beacon channels shall always use the reserved midambles $m^{(1)}$ and $m^{(2)}$, see 6.5. For DL physical channels that are located in time slot 0, midambles shall be allocated based on the default midamble allocation scheme, using the association for K=8 midambles. For all other DL physical channels, the midamble is explicitly assigned by higher layers or allocated by layer 1.

6.6.1.1 Midamble Allocation by signalling from higher layers

The midamble allocation by signalling is the same like in the 3.84 Mcps TDD cf. [5.6.1.1 Midamble allocation by signalling from higher layers]

6.6.1.2 Midamble Allocation by layer 1

6.6.1.2.1 Default midamble

The default midamble allocation by layer 1 is the same like in the 3.84 Mcps TDD cf. [5.6.1.2.1 Default midamble]. The associations between midambles and channelisation codes are given in Annex C.2 [Association between Midambles and channelisation Codes].

6.6.1.2.2 Common Midamble

The common midamble allocation by layer 1 is the same like in the 3.84 Mcps TDD cf. [5.6.1.2.2 Common midamble]. The respective associations are given in Annex D [Signalling of the number of channelisation codes for the DL common midamble case for 1.28 Mcps TDD].

6.6.2 Midamble Allocation for UL Physical Channels

The midamble allocation for UL Physical Channels is the same like in the 3.84 Mcps TDD cf. [5.6.2 Midamble allocation for UL Physical Channels]

Annex D (normative)
Signalling of the number of channelisation codes for the DL common midamble case for 1.28Mcps TDD

The following mapping schemes shall apply for the association between the number of channelisation codes employed in a timeslot and the use of a particular midamble shift in the DL common midamble case. In the following tables the presence of a particular midamble shift is indicated by '1'. Midamble shifts marked with '0' are left unused.

D.1 Mapping scheme for K=16 Midambles

m1	m2	m3	m4	m5	m6	M7	M8	m9	m10	m11	m12	M13	m14	m15	m16	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 code
0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 codes
0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	3 codes
0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	4 codes
0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	5 codes
0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	6 codes
0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	7 codes
0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	8 codes
0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	9 codes
0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	10 codes
0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	11 codes
0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	12 codes
0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	13 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	14 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	15 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	16 codes

D.2 Mapping scheme for K=14 Midambles

m1	m2	m3	m4	m5	m6	M7	M8	m9	m10	m11	m12	M13	m14	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	1 or 15 code(s)
0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	2 or 16 codes
0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	3 codes
0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	4 codes
0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	5 codes
0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	6 codes
0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	7 codes
0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	8 codes
0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	9 codes
0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	10 codes
0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	11 codes
0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	12 codes
0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	13 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	14 codes

D.3 Mapping scheme for K=12 Midambles

m1	m2	m3	m4	m5	m6	M7	M8	m9	m10	m11	m12	
1	0	0	0	0	0	0	0	0	0	0	0	1 or 13 code(s)
0	1	0	0	0	0	0	0	0	0	0	0	2 or 14 codes
0	0	1	0	0	0	0	0	0	0	0	0	3 or 15 codes
0	0	0	1	0	0	0	0	0	0	0	0	4 or 16 codes
0	0	0	0	1	0	0	0	0	0	0	0	5 codes
0	0	0	0	0	1	0	0	0	0	0	0	6 codes
0	0	0	0	0	0	1	0	0	0	0	0	7 codes
0	0	0	0	0	0	0	1	0	0	0	0	8 codes
0	0	0	0	0	0	0	0	1	0	0	0	9 codes
0	0	0	0	0	0	0	0	0	1	0	0	10 codes
0	0	0	0	0	0	0	0	0	0	1	0	11 codes
0	0	0	0	0	0	0	0	0	0	0	1	12 codes

D.4 Mapping scheme for K=10 Midambles

m1	m2	m3	m4	m5	m6	M7	M8	m9	m10	
1	0	0	0	0	0	0	0	0	0	1 or 11 code(s)
0	1	0	0	0	0	0	0	0	0	2 or 12 codes
0	0	1	0	0	0	0	0	0	0	3 or 13codes
0	0	0	1	0	0	0	0	0	0	4 or 14 codes
0	0	0	0	1	0	0	0	0	0	5 or 15 codes
0	0	0	0	0	1	0	0	0	0	6 or 16 codes
0	0	0	0	0	0	1	0	0	0	7 codes
0	0	0	0	0	0	0	1	0	0	8 codes
0	0	0	0	0	0	0	0	1	0	9 codes
0	0	0	0	0	0	0	0	0	1	10 codes

D.5 Mapping scheme for K=8 Midambles

M1	m2	m3	m4	m5	m6	m7	m8	
1	0	0	0	0	0	0	0	1 or 9 code(s)
0	1	0	0	0	0	0	0	2 or 10 codes
0	0	1	0	0	0	0	0	3 or 11 codes
0	0	0	1	0	0	0	0	4 or 12 codes
0	0	0	0	1	0	0	0	5 or 13 codes
0	0	0	0	0	1	0	0	6 or 14 codes
0	0	0	0	0	0	1	0	7 or 15 codes
0	0	0	0	0	0	0	1	8 or 16 codes

D.6 Mapping scheme for K=6 Midambles

M1	m2	m3	m4	m5	m6	
1	0	0	0	0	0	1 or 7 or 13 code(s)
0	1	0	0	0	0	2 or 8 or 14 codes
0	0	1	0	0	0	3 or 9 or 15 codes
0	0	0	1	0	0	4 or 10 or 16 codes
0	0	0	0	1	0	5 or 11 codes
0	0	0	0	0	1	6 or 12 codes

D.7 Mapping scheme for K=4 Midambles

M1	m2	m3	m4	
1	0	0	0	1 or 5 or 9 or 13 code(s)
0	1	0	0	2 or 6 or 10 or 14 codes
0	0	1	0	3 or 7 or 11 or 15 codes
0	0	0	1	4 or 8 or 12 or 16 codes

D.8 Mapping scheme for K=2 Midambles

M1	m2	
1	0	1 or 3 or 5 or 7 or 9 or 11 or 13 or 15 code(s)
0	1	2 or 4 or 6 or 8 or 10 or 12 or 14 or 16 codes

---------- Changes to working CR of 25.221 end ----------